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Mobile phone with carrying device

The invention relates to a mobile phone (2) with a carrying device in the form of a wrist strap (6), wherein a base (5) is fastened to the wrist strap (6) and the fully functioning mobile phone (2) is releasably connected by a telescopic aerial (7) to the base (5).

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## Description

The invention relates to a mobile phone with a carrying device in the form of a wrist strap.

A mobile phone of this kind is known from US-4,847,818, in which the transceiver is mounted in a watch case. The watch case also has a digital display and a keypad. Attached to the watch case is a wrist strap with a speaker and a microphone at its ends, each connected by leads to the transceiver. These leads are arranged in the wrist strap, while the wrist strap itself is made of an electrical insulator. The leads also serve as dipole aeriels. For telephoning, the wrist strap is released from the wrist and held by the watch case. To activate the transceiver, a special push button is provided on the watch case. The disadvantage of the mobile phone is in particular the inconvenient removal and replacement of the wrist strap in order to telephone.

Known from US-5,008,864 is a mobile phone which has a body to accommodate a battery, which may be divided by means of a hinge-like opening mechanism. In addition the body serves to accommodate the transceiver mounted in a casing. Fitted to the body is a wrist strap containing an aerial and a microphone, while on the other hand the speaker is located in the casing of the transceiver. For telephoning, the wrist strap must similarly be released. The publication also proposes an alternative design to obviate the problem of constant opening and closing of the wrist strap when telephoning. This involves the use of a separate speaker part, which may be connected to the transceiver. At the other end of the separate part is the actual speaker, which is provided with a holding aid. For telephoning, the user holds the hand to the ear, clamping the speaker to the holding aid with the fingers. At the same time the microphone is located in the vicinity of the mouth, in the wrist strap. The disadvantage of this mobile phone is the unusual hold and the warming of the ear by the hand during telephoning. Moreover the user must always keep the separate speaker part with them, since it can not be fixed to the wrist strap or the casing. This however involves a risk of forgetting or losing the part, in which case the mobile phone can not be used.

Known from EP 0 572 252 is a mobile phone with wrist strap, in which the unfastened part of the wrist strap is designed to swivel through 90° by means of a rotatable joint. At the end of the unfastened part of the wrist strap is the speaker, with the microphone located on the fastened part of the wrist strap in the vicinity of the joint. The advantage is that there is no need for separate parts to be carried, while it is possible to telephone without removing the wrist strap. On the other hand there is the disadvantage of an extremely cramped body position when telephoning.

The invention is therefore based on the technical problem of devising a mobile phone, with a carrying device in the form of a wrist strap, which may be used with the maximum degree of comfort.

The technical problem is solved by the features of patent claim 1. Here the fully functional mobile phone is releasably attached to a base to which the wrist strap is fastened. This enables the mobile phone to be released from the base for telephoning, and used like a conventional mobile phone, without the need to release the wrist strap or to carry other separate parts.

Other advantageous forms of the invention are disclosed in the dependent claims.

Through the additional provision in the base of a base battery, via which the operating battery of the mobile phone may be charged when connected, the operating battery is able to have a smaller capacity, so that the mobile phone may be made more compact due to the smaller space needed for the operating battery.

In order to enhance battery operating time, the operating battery and/or the base battery are assigned flywheel generators known from hearing-aid technology, in which the natural movement of the wrist of the wearer is converted into an electrical voltage to charge the batteries. Preferably the operating battery is in the form of a lithium button cell.

In a further preferred embodiment, the microphone is located on or in the aerial head, and the speaker on the casing of the mobile phone. Because of this, the electromagnetic fields which develop at the aerial occur at a greater distance from the head than is the case with conventional mobile phones, which is of interest due to the possible adverse effects on health of the high-frequency electromagnetic fields connected with mobile phones.

For electrical connection of the microphone to the transceiver located in the casing, the telescopic aerial is tubular in form, so that the two electrical connection leads may be fed through inside the aerial. Alternatively the aerial tube itself may also be used as a conductor, so that only one other internal lead is required. The radio frequencies and the microphone frequencies are so far apart that they can not overlap or interfere with one another. The microphone is preferably in the form of a piezoelectric microphone.

The mobile phone may be connected releasably to the base via various fastening devices. The connection should be easy to release but have adequate safeguards against accidental release of the mobile phone.

In a further preferred embodiment, a seal ring is provided between the base and the locking of the mobile phone, to protect the mobile phone from splashes. In addition, though, it is necessary to protect the opening for the telescopic aerial, which may be achieved for example by means of a watertight membrane on the microphone or a radial seal at the aerial outlet point.

Preferably the mobile phone is designed as a multi-functional component, i.e. a watch is integrated with the telephone function. It is also possible to integrate a GPS receiver, through which help may be obtained via an emergency system in situations of danger. Provision may also be made for personal data specific to the wearer, as for example blood group, illness, etc. details to be engraved on the base of the wrist strap.

The keypad is preferably arranged radially on the periphery of the casing, so that its elements may be spaced apart as far as possible, with for example 12 key panels being provided. In this 12-place array the keypad is also self-explanatory, which compensates for the problems of switching over from the regular block keypad. The assignment of the peripheral letters in alphabetical order is also self-explanatory. In contrast to normal mobile phones, however, each key has only 2 instead of 3 letters, with the exception of the first or last two keys. For energy reasons, the time on the display is shown preferably only by means of a luminous bar or spot, since 5-minute steps or quarter-hours may be estimated with sufficient precision from the position in the area of the keys, on the principle of the single-hand watch. It is however also possible to use two luminous bars or one luminous bar with a luminous spot.

The invention is explained in detail below with the aid of a preferred embodiment. The figures show:

Fig. 1 a-c: various views of a technical representation of an oval multi-functional component with mobile phone for the D-network, on a base,

Fig. 2 a-d: various views of a technical representation of a round mobile phone for the E-network, after removal of the base, and

Fig. 3: a schematic perspective view of the mobile phone in use.

The multi-functional component 1 comprises a mobile phone 2 and a watch with watch face 3 arranged on the upper side of the mobile phone 2. The multi-functional component 1 is fastened releasably to a base 5 by means of a snap-on fastener 4. Fixed to the base 5 is a wrist strap 6 for fastening the base 5 to the wrist of a user. Provided at the end face of the multi-functional component 1 is a telescopic aerial 7, with a piezoelectric microphone 8 mounted on its aerial head. To the side of the aerial 7 are two function buttons 9 for the mobile phone 2 and the watch. Arranged radially on the upper side of the mobile phone 2 are twelve key panels 10 with a double or triple key assignment.

For example the first key covers the number 1 and the letters A and M, the second key the number 2 and the letters B and N and so on.

The mobile phone 2 is fully functional, i.e. no components of the mobile phone 2 are integrated in either the wrist strap 6 or the base 5. The wrist strap 6 is used solely for attaching the base 5, and the multi-functional component 1 connected to the latter, to the wrist of a user. To adjust to the thickness of the wrist, the wrist strap 6 is provided with an adjustable closing device, not shown. The base 5 is provided optionally with a base battery which, when the mobile phone 2 is engaged, is connected to an operating battery located in the mobile phone. The base battery has a much greater storage capacity than the operating battery, which provides the sole electrical power source during telephoning. However, so that the mobile phone 2 may be made as compact as possible, the operating battery is for example in the form of a lithium button cell which, on completion of telephoning and after being snapped on to the base 5 once again, is charged up by the base battery. The size of the base battery is limited essentially only by the dimensions of the base body 5. To extend the operating time of base and operating batteries, they may be assigned flywheel generators. Provision may also be made for the batteries to be charged up via a base station, for example when the user removes the wrist strap 6 and the entire unit on going to bed.

The telescopic aerial 7 is tubular in form, so that the electrical connection leads of the piezoelectric microphone 8 may be led to the transceiver inside the aerial 7. Alternatively the aerial 7 itself may act as a connection lead for the microphone 8. Since the aerial, on account of the connection leads running inside it, is in the form of a rigid tube, the diameter of the mobile phone 2 is determined on the one hand by the maximum possible aerial length which can be accommodated. On the other hand the aerial length is determined by  $\lambda/4$  of the network frequency of the E-network or the D-network (double length).

In the snapped-in state, the multi-functional component 1 is used as a watch. To show the time, a red luminous bar or spot for example are produced on the surface. From these, the time may be deduced on the principle of the single-hand watch. This mode of presentation leads to the least possible energy load on the batteries. In principle, however,

all conceivable modes of presentation are possible. To enhance accuracy of reading, permanent markings may also be made on the surface. Only for the sake of completeness it should be noted that the shape of the multi-functional component 1 is not limited to an oval or circular shape but may be adapted ergonomically, in particular from the standpoint of ease of handling, to the hand of the user. In addition the keys 10 may also be ergonomically adapted and may for example have perceptible elevations which facilitate reliable assignment of the keys 10 even under conditions of poor visibility. The display 3 may also be in the form of a touch-screen display.

For telephoning, the mobile phone 2 is released from the base 5, the aerial 7 is extended, as shown in Fig. 2 a-d, and a function key 9 is pressed to bring the phone into use. The speaker 11 is located on the lower side of the casing of the mobile phone 2. The user then holds the mobile phone 2 by the casing and guides it with the lower side to his ear, as shown in Fig. 3. As is evident from the different variants of Figs. 1 and 2, the diameter may be adapted to the required aerial length via the oval or round shape, without the need for a corresponding increase in the overall dimensions of the mobile phone 2. Apart from these functional purposes, the different shapes also have an aesthetic function.

The multi-functional component 1 may also be provided with a GPS receiver, so that an emergency system may be called in cases of danger or emergency, in which case additional information concerning the wearer, for example blood group, diabetes, allergies, etc. may be engraved on the base 5.

#### Patent claims

1. Mobile phone comprising at least one microphone and one speaker, with a carrying device in the form of a wrist strap, **characterised in that** a base (5) is fastened to the wrist strap (6), the fully functional mobile phone (2) is provided with a telescopic aerial (7), and the fully functional mobile phone (2) is connected releasably to the base (5).



2. Mobile phone according to claim 1, characterised in that the base (5) and/or the wrist strap (6) are/is assigned a base battery through which an operating battery of the mobile phone (2) may be charged up when the mobile phone (2) is connected to the base (5).
3. Mobile phone according to claim 2, characterised in that a flywheel generator is assigned to the operating battery and/or the base battery.
4. Mobile phone according to claim 2 or 3, characterised in that the operating battery is in the form of a lithium button cell.
5. Mobile phone according to any of the preceding claims, characterised in that the microphone (8) is mounted in or on the aerial head, and the speaker (11) is mounted on the casing of the mobile phone (2).
6. Mobile phone according to claim 5, characterised in that the aerial (7) is tubular in form and one or more connection leads of the microphone (8) run(s) inside the aerial (7).
7. Mobile phone according to any of the preceding claims, characterised in that the microphone (8) is in the form of a piezoelectric microphone (8).
8. Mobile phone according to any of the preceding claims, characterised in that the mobile phone (2) and the base (5) may be connected to one another by means of a bayonet, slide, hook or snap-in connection (4).
9. Mobile phone according to any of the preceding claims, characterised in that a seal ring to protect the speaker (11) is provided between the base (5) and the mobile phone (2), and the microphone (8) may be sealed by a watertight membrane or a radial seal at the aerial exit point.
10. Mobile phone according to any of the preceding claims, characterised in that the mobile phone (2) is designed as a multi-functional component (1) with integral watch.

11. Mobile phone according to claim 10, characterised in that, to make the keypad spacing as large as possible for greater use of use, the display and the watch face (3) are arranged centrally, and the keypad (10) of the mobile phone (2) radially, on the outwards-facing surface of the mobile phone (2).

12. Mobile phone according to claim 11, characterised in that the keypad (10) is formed of twelve keys with double or triple assignment.

13. Mobile phone according to any of claims 10 to 12, characterised in that the watch face (3) appears on the display as a luminous bar or luminous spot in the form of a single-hand watch, or as two luminous bars or one luminous bar and a luminous spot as a double-hand version.

14. Mobile phone according to claims 11 to 13, characterised in that the display (3) is in the form of a touch-screen display.

15. Mobile phone according to any of the preceding claims, characterised in that the mobile phone (2) is assigned a GPS receiver, by means of which the current location may be determined via an emergency system.

see also 3 pages of drawings

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